ABSORPTION OF WATER BY ROOTS.—Vesque gives the following results of his experiments:

1st. The absorption of water by roots is not proportionate to the temperature of the leaves when the latter are surrounded by an atmosphere not saturated with moisture. At low temperatures it increases only slightly as the temperature rises; but at a certain degree fixed for each plant absorption increases rapidly, and at a maximum temperature becomes stationary; this maximum varies in different species.

2d. The absorption of water by roots is independent of the temperature of the leaves when these are surrounded by a saturated atmosphere, in the dark, and protected from calorific radiation.

3d. Calorific radiation in the dark acts in a very energetic manner upon transpiration in saturated air, and produces upon absorption the same effect as an elevation of temperature does upon leaves which are in dry air.—*From Annales des Sciences Naturelles, September*, 1877.

ZOÖLOGY.[1]

HOMOLOGIES OF THE EAR-BONES OF MAMMALS, ETC.—Professor G. Baraldi, in the *Atti della Societa Toscana di Scienze Naturali*, of Pisa, for 1877, has a paper on the homologies of the organs accessory to respiration in fishes, and the organs of hearing in the higher vertebrates, with special reference to the homologies of the branchiostegal and opercular bones of fishes, the tympanic bones and cartilages of the ear-conch of mammalia. A plate and tabular synopsis which accompany the paper show that he regards the hyomandibular of fishes, the columella of amphibia, reptiles and birds as homologues of the stapes of mammals; and the symplectic of fishes, suspensory cartilage of amphibia, ossicle of the tensor tympanica of reptiles and birds as homologues of the orbiculon or lenticulon of mammals. The bone homologous with the incus of mammals, are the quadrate (Gegenbaur), tympanic (Owen) of reptiles and birds; the quadrate or suspensorium of amphibia, the quadrate, hypotympanic, jugal, hypocotyleal, os quadrato-jugal as it has been variously called, of fishes. The articulare of fishes, amphibians, reptiles and birds are homologues of the mammalian malleus. The branchiostegal rays of fishes, the cartilaginous tympanic ring of amphibians, without homologue in reptiles and birds, is homologous with the tympanic ring of mammals. The interoperculum of fishes (no homologues in amphibians, reptiles and birds) is homologous with the annular or tubiform cartilage of mammals. The opercular of fishes, homologues wanting in amphibians, reptiles and birds, is regarded as homologous with the cartilaginous ear-conch of mammals. The sub-operculum of fishes (homologues absent in amphibians, reptiles

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and birds) are regarded as the homologue of the scutiform cartilage in mammals.

It will be noticed upon comparison with Huxley (*Anatomy of Vertebrates*) that while the latter author divides the otic bones in mammals between the hyoidean and mandibular arches, Professor Baraldi puts the malleus (articular), the incus (quadrate), the orbiculare and stapes (columella), all in the mandibular arch. The differences between the two authorities on the homologies of these parts in other forms consists mainly in this, that Baraldi puts the stapes, columella and orbiculare into the mandibular arch in all the forms, while Huxley relegates them to the hyoidean. The studies are all from actual subjects.

TERRESTRIAL MOLLUSCA OF TEXAS.—During a recent visit to Texas the writer had an opportunity of making quite an extensive collection of the land shells, and a still more interesting collection of the *Reptilia* and *Batrachia*. The land shells exhibited a few peculiar characters which would be of interest if fully discussed. The species discovered were as follows:

1. *H. thyroides* Say; two varieties, one of which has the umbilicus closed. This variety was the only one occurring at Orange and Beaumont, on the Texas and New Orleans Railroad, one hundred miles east of Huston. At Huston only the typical species was found. Mr. Bland, who has kindly examined these shells, suggests that the non-umbilicate variety is the *H. bucculenta* Gould.

2. *Zonites friabilis* W. G. Binney. Typical; rare, under bushes at Orange.

3. *Helix monodon* Racket; a small, elevated variety, under logs in pine woods.

5. *Bulimulus alternatus* Say. Common under bushes in prairies.

6. *Helix mooreanus* W. G. Binney; "considered a variety of *H. tholus*." (Bland.)

7. *Helicina tropica* Jan.

8. *H. berlandieriana* Moricand. This shell occurred in great abundance in the grass, on a sandy bluff of the bayou at Huston, associated with the *H. triodontoides* Bland, and *H. thyroides* Say. In this situation the shells were almost totally without cover, a circumstance somewhat anomalous.

9. *H. texasiana* Moric.; abundant under logs, bark, stones, etc.

10. *H. espiloca* Ravenel; abundant at Orange, and also at Brashear City, La., under bits of bark, boards, small sticks, etc.; even in the door-yards of private residences. Associated with it was *Helix pulchella* Müll., and *Pupa pentodon* Say, at Brashear City.

11. *Helix vultuosa* Gould, "typical," (Bland). With this was found, at a place twenty miles north of Beaumont, in Hardin

County, a very curious variety, which differs, materially, and for which I propose the name of *H. copei*, or *H. vultuosa* variety *copei*, and of which the following is a description:

Shell reddish, somewhat thin, deeply striated by lines of growth, and of medium size. Spire somewhat depressed in some specimens, slightly more elevated in others. Whorls five, transversely striated with oblique lines of growth, and increasing very gradually and regularly in size; a faint carina appearing at the junction of the upper third and lower two-thirds of the body-whorl, from which the latter tapers inwardly to the base of the shell. Sutures regularly and moderately impressed. Peristome sub-acute, and broadly reflected outward and downward at its lower two-thirds, and bearing on its basal third an acute carina, within which is seen a prominent, vertical, double tooth, of which the outer portion is the larger. A second tooth is carried by the inner margin of the peristome at the centre of the body-whorl, the point of which is in close relation to an arcuate tooth carried by the parietal wall of the aperture. Umbilicus wide, exhibiting most of the volutions. Height 7 mm. Lesser diameter 12 mm. Greater diameter 14 mm. This size is about the average.

This shell differs from the *H. vultuosa* Gould, to which it is closely allied, and of which it is perhaps but a very distinct variety, in the following particulars: It is a larger shell but of lighter texture. The lines of growth are more deeply impressed, though this character might not be constant in a larger number of specimens. The lip is much more broadly reflected below, with a sharper central angle, and much more produced outwardly, at the point of junction of the upper third with the lower two-thirds. The umbilicus is much wider, exhibiting the volutions more plainly. The arrangement of the teeth is very distinct in the two species or varieties under consideration. This shell I collected under logs in pine woods, twenty miles north of Beaumont, in Hardin County, Texas, where it was associated with the *H. bucculenta* Gould, *Zonites intertextus* Binney, *H. monodon* Racket, *Helicina tropica* Jan., *Zonites demissus* Binney, and *Zonites arboreus* Say. I dedicate the shell, with great pleasure, to my friend, Prof. E. D. Cope.

The specimens of *Z. intertextus* and *Z. demissus* were very large, and some of the latter exhibit the peculiarity of bearing an indistinct carina.—*W. G. Weatherby.*

A Strange Flight of Hawks.—A very curious phenomenon occurred in this neighborhood during the last week in September. A number of trustworthy persons who witnessed the sight all give the same facts. Near Middle river, about sixteen miles south of Fulton, thousands of large hawks were seen circling just

above the trees. After they reached the creek near A. T. Williams' farm, large numbers of them lit in the trees and collected close together. Parties with shot-guns went in among them and killed a number, but the hawks seemed tired and determined to rest, and the firing failed to put any considerable number of them to flight. Those that did fly soon settled down again. After resting about three hours they rose again, forming great circles often interlacing each other, and pursued their flight toward the south. The specimens killed and examined show that they were not quite so large as hen-hawks, and they were not prairie-hawks. R. W. Maid, who witnessed this extraordinary sight at a point some eight miles distant, says they were "quail-hawks," and that as the quails begun to leave the country, they were in pursuit. Many of the hunters who were out looking for birds tell us that they saw hundreds of quail in the immediate neighborhood of the hawks, but they refused to fly, and ran, as if in terror, to the thickest parts of the brush. That there were an immense number of hawks is shown by the fact that no one could see them all at once, though they were flying very high; and by the fact that they were seen at about the same hour by persons eight and ten miles apart.—*California paper.—Communicated by R. E. C. Stearns.*

A Texan Cliff Frog.—G. W. Marnock has recently discovered in south-western Texas a new species of the genus *Lithodytes*, which Prof. Cope calls *L. latrans*. It lives in fissures in the limestone cliffs that stretch across that section of the state. According to Mr. Marnock the eggs hatch out in the winter, and the tadpoles live in the rainwater which is caught in the shallow holes in the rocks, far from the creeks. During the winter the adults are very noisy, the rocks resounding in the evening with their dog-like bark. The noise is supposed by the country people to be made by lizards, especially the *Gerrhonotus infernalis* which occurs in the same region. *Lithodytes* Cope, embraces many other species, from Mexico and South America. It is referred to the *Cystignathidæ.*

Occurrence of the Phyllopod Eubranchipus in winter.—Specimens of adult male and female *Eubranchipus vernalis* Verrill, were brought, on January 10th, into the Museum of the Peabody Academy of Science, from Danvers, Mass., by Mr. John H. Cook. Mr. John Sears, an observing man, who saw these specimens, assures me that he has found similar ones in Danvers in early winter (December) when the ice is forming. It has also been observed by Mr. J. S. Kingsley and myself at Salem, Mass., April 12th, and there is now no reasonable doubt but that this species attains it maturity in the autumn from eggs dropped by the females in the spring, and it is probable that most of the species of this family attain their development late in the summer and early in the autumn.—*A. S. Packard, Jr.*